

Exercise to Regenerate Your Cells

Researchers recognize that exercise improves sleep, reduces depression, helps regulate weight, maintains muscle, and boosts immunity. Now scientists have found that certain types of exercise may help regenerate key cells that normally decline with aging. Scientists published an article in Cell Metabolism magazine stating that HIIT (high intensity interval training) cardiovascular exercises like biking and walking induced cells to produce more proteins for energy-making mitochondria and protein-building ribosomes, which help halt aging at the cellular level.

The study's senior author Sreekumaran Nair, an MD and diabetes researcher at the Mayo Clinic in Rochester, Minnesota had 36 women and 36 men aged 18-30 years old ("young group") and volunteers aged 65-80 years old ("older group") in the study. Each group was divided into three different exercise programs: one in which volunteers did high-intensity interval biking, one where volunteers used weights and did strength training, and one that used both strength training and interval training. Then the scientists took biopsies from participants' thigh muscles and compared the molecular makeup of their muscle cells to samples from inactive volunteers. Scientists evaluated the subjects' lean muscle mass as well as insulin sensitivity. The research was led by Matthew Robinson, who at the time was a post-doc and is currently an Oregon State University faculty member.

While strength training was effective at increasing muscle mass, the biggest benefits at the cellular level were seen with HIIT. A 49% increase in mitochondrial capacity was observed in the younger volunteers and older subjects saw a 69%

increase. Insulin sensitivity, which shows a lower risk of developing diabetes, was also seen in the interval training groups. Interval training was not as effective in improving muscle strength, which normally declines with age. Dr. Nair advises, "If people have to pick one exercise, I would recommend high-intensity interval training, but I think it would be more beneficial if they could do 3-4 days of interval training and then a couple days of strength training." He notes that any exercise beats no exercise.

The study was completed to understand how exercise benefits individuals at the molecular level. The energy-producing ability of our cells' mitochondria decline as we age. In comparing RNA-sequencing and proteomic data from individuals doing different exercises, the scientists found evidence that exercise promotes cells to make more RNA copies of genes coding for proteins in the mitochondria and those necessary for muscle growth. Mitochondrial proteins were also produced via exercise.

The increase in muscle protein content was the most impressive finding of the research.